

EXHIBIT 4

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.,)
)
Plaintiff,)
) Case No.
vs.) CV 10-03561 WHA
)
GOOGLE, INC.,)
)
Defendant.)
_____)

VIDEOTAPED DEPOSITION OF MARK REINHOLD, Ph.D.

San Francisco, California

Tuesday, March 15, 2016

Volume I

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<p style="text-align: right;">Page 102</p> <p>1 edition."</p> <p>2 Do you see that?</p> <p>3 A Yes.</p> <p>4 Q Let me just show you a copy of Trial</p> <p>5 Exhibit 1062.</p> <p>6 Are you familiar with Exhibit 1062,</p> <p>7 Dr. Reinhold?</p> <p>8 A Yes, I am.</p> <p>9 Q You offered this exhibit into evidence, or</p> <p>10 testified about it at the trial before, correct?</p> <p>11 A Yes.</p> <p>12 Q Did you create Exhibit 1062?</p> <p>13 A Yes.</p> <p>14 Q How did you create Exhibit 1062?</p> <p>15 A I created Exhibit 1062 by doing a</p> <p>16 semi-automated analysis of the text of the Java</p> <p>17 language specification.</p> <p>18 Q What tool did you use to do that</p> <p>19 automation?</p> <p>20 A It was a series of UNIX shell scripts that</p> <p>21 I wrote.</p> <p>22 Q What does -- okay. And 1062, just looking</p> <p>23 at the title up above, it seems, or description, is</p> <p>24 "Classes and Interfaces Mentioned in the Java</p> <p>25 Language Specification, third edition," correct?</p>	<p style="text-align: right;">Page 104</p> <p>1 Q -- in the JLS? What's the reason?</p> <p>2 A Exhibit 1062 is incorrect.</p> <p>3 Q What is incorrect about 1062?</p> <p>4 A Exhibit 1062 mistakenly includes the</p> <p>5 interface Java.util.iterator, and it mistakenly</p> <p>6 excludes two enum classes:</p> <p>7 Java.lang.annotation.element type, and</p> <p>8 Java.lang.annotation.retention policy.</p> <p>9 Q How or when did you figure that out?</p> <p>10 A I realized this while preparing</p> <p>11 Exhibit 1509.</p> <p>12 Q How did you prepare Exhibit 1509?</p> <p>13 A Exhibit 1509 began with a draft produced</p> <p>14 by Professor Schmidt, which I then reviewed and</p> <p>15 cross-checked with the Java language specification,</p> <p>16 3rd edition.</p> <p>17 Q With a -- did you look at a hard copy of</p> <p>18 the book?</p> <p>19 A No.</p> <p>20 Q Did you look at an electronic copy of the</p> <p>21 book?</p> <p>22 A Yes.</p> <p>23 Q And describe for me what you did in terms</p> <p>24 of that cross-referencing.</p> <p>25 A So in that cross-referencing, I referred</p>
<p style="text-align: right;">Page 103</p> <p>1 A Yes.</p> <p>2 MR. KAMBER: Let me have marked as</p> <p>3 Exhibit 1509 Exhibit A to the Rule 26 disclosures.</p> <p>4 (Exhibit 1509 was marked for</p> <p>5 identification and is attached hereto.)</p> <p>6 BY MR. KAMBER:</p> <p>7 Q Do you recognize Exhibit A?</p> <p>8 A Yes, I do.</p> <p>9 MR. RAMSEY: Do you have an extra copy?</p> <p>10 MR. KAMBER: It's right here.</p> <p>11 MR. RAMSEY: Oh, I'm sorry.</p> <p>12 BY MR. KAMBER:</p> <p>13 Q What is it?</p> <p>14 A Exhibit A is a more -- is the result of a</p> <p>15 more detailed analysis of the items mentioned in</p> <p>16 Exhibit 1062.</p> <p>17 Q Now, this may be a technicality, but</p> <p>18 perhaps you can explain it to me.</p> <p>19 I counted 62 lines, at least, in this --</p> <p>20 in Exhibit A.</p> <p>21 A Yes.</p> <p>22 Q Is there any -- do you know why this might</p> <p>23 list 62 -- have 62 lines whereas Exhibit 1062 refers</p> <p>24 to 61 classes and interfaces mentioned --</p> <p>25 A Yes.</p>	<p style="text-align: right;">Page 105</p> <p>1 to some of the intermediate materials that I had</p> <p>2 saved from the process of preparing Exhibit 1062,</p> <p>3 and I also cross-checked all of the actual textual</p> <p>4 mentions in the Java language specification, taking</p> <p>5 more time than I did for 1062 because that was</p> <p>6 during the trial, and it was a very limited time</p> <p>7 effort.</p> <p>8 Q So turning back to the description of what</p> <p>9 you might testify about, what are your opinions</p> <p>10 regarding the 62 classes and interfaces listed on</p> <p>11 Exhibit 1509 with respect to being subject to a</p> <p>12 technical constraint imposed by the Java language</p> <p>13 specification?</p> <p>14 A At a high level, my conclusion is that the</p> <p>15 Java language specification places very few</p> <p>16 technical constraints on any of these classes.</p> <p>17 In most cases, the language specification</p> <p>18 merely indicates that a class of a given name and a</p> <p>19 given package must exist. In some cases, it says</p> <p>20 that a class of a particular name must contain a</p> <p>21 method or two or have a certain annotation.</p> <p>22 The one exceptional case is the class</p> <p>23 Java.lang.object where the Java language</p> <p>24 specification as shown on page 4 of 5 says more than</p> <p>25 that there simply is a class object. It also gives</p>

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<p style="text-align: right;">Page 106</p> <p>1 a list of the methods and the declaring code for 2 those methods, and asserts that these methods must 3 exist in that class. That does not, of course, 4 limit the presence of other methods. 5 The other slight exception is, in the two 6 enum classes at the very bottom, element type and 7 retention policy, the Java language specification 8 constrains these classes to contain enumeration 9 elements of the given names. 10 Q So are you saying, or is it your opinion 11 that to the extent that the Java language 12 specification has some technical constraints or 13 imposes some technical constraints on these 14 particular classes, that the technical constraint is 15 actually -- it's a limited technical constraint, 16 that is, it's a narrow technical constraint? 17 A Yes. 18 Q Just as a technical matter, why is it a 19 narrow constraint? 20 A The Java language specification strives to 21 be a specification of the language. It does not 22 strive to specify any of the Java APIs beyond the 23 extent necessary to specify the language. 24 Q Is that opinion different than the opinion 25 that you expressed at the -- in the first phase of</p>	<p style="text-align: right;">Page 108</p> <p>1 the Java language specification? 2 A I'm sorry. Could you repeat the question? 3 Q Sure. 4 What, if any, opinions do you have that 5 declaring code and SSO not included on the table 6 that is Exhibit 1509 are not subject to a technical 7 constraint imposed by the Java language 8 specification? 9 A Any SSO expressed in the declaring code of 10 the 37 packages that is not also expressed in the 11 fragments of declaring code in this table are not 12 mandated by the Java language specification. 13 Q Whereas those -- whereas the SSO expressed 14 in the declaring code listed are these fragments 15 that are listed in Exhibit 1509, it's your opinion 16 that those are mandated by the Java language 17 specification, correct? 18 MR. RAMSEY: Objection. Form. 19 THE WITNESS: Yes. 20 BY MR. KAMBER: 21 Q Turning back to Exhibit 1508, 22 Dr. Reinhold, it says that you may -- starting 23 on line 7, that you "may also present testimony 24 regarding the advantages of Java as compared to 25 other programming environments or platforms."</p>
<p style="text-align: right;">Page 107</p> <p>1 this case at the trial? 2 A I don't believe so. 3 Q With respect to Exhibit 1509, what, if 4 anything, does it show about the SSO? 5 A It shows a very small -- very small 6 portion of the overall SSO. 7 Q How does it show the SSO? 8 A So the SSO is expressed in the fragments 9 of declaring code that you can find in -- well, it 10 is partly expressed in the fragments of declaring 11 code that you can find in the right-hand column of 12 the table. 13 Q So, for example, for the first class 14 Java.lang.abstract method error, you're referring to 15 the SSO being -- where is the -- how is the SSO 16 reflected in the declaration listed in the 17 right-hand column? 18 A In the fragment of declaring code in the 19 right-hand column, the aspects of the SSO that are 20 expressed are the existence of a package called 21 Java.lang, the presence of a class called abstract 22 method error within that package, and no more. 23 Q What, if any, opinion do you have that 24 declaring code and SSO not listed in Exhibit 1509 25 are not subject to a technical constraint imposed by</p>	<p style="text-align: right;">Page 109</p> <p>1 Do you see that? 2 A Yes. 3 Q What, if any, opinions do you intend to 4 offer on that -- on that topic? 5 A Again, I'm not sure exactly what I will 6 say at trial, but sitting here today, I think that 7 Java has many advantages relative to other common or 8 uncommon programming environments. 9 Q Can you please give me some examples? 10 A Amongst those examples are, it is a 11 high-level language that insulates developers from 12 lots of low-level details that you find necessary to 13 deal with in other languages, such as C or C++. 14 It includes features built in such as 15 garbage collection and threading. It includes, as 16 we have been discussing, a rich set of APIs for many 17 different capabilities. 18 And over the last 20 years, a very rich 19 ecosystem has grown up around it such that if a 20 particular Java platform you might be using doesn't 21 contain something, it's very likely you can find an 22 open source library that does provide that 23 functionality. 24 There are also millions of Java 25 developers, which is a big strength of the</p>

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